CLAIMS

1. A film deposition method for forming a Cu film on a substrate by a CVD by using a source material containing a Cu-carboxylic acid complex or a derivative thereof.

2. A film deposition method comprising the steps of:

supplying a source material including a Cu-carboxylic acid complex or a derivative thereof onto a substrate; and

supplying a reductive gas to the substrate after stopping supplying the source material,

wherein the step of supplying the source material and the step of supplying the reductive gas are performed alternately.

3. A film deposition method comprising the steps of:

placing a substrate in a process container; and

repeating the following steps (a) to (d):

(a) supplying a source material including a Cu-carboxylic acid complex or a derivative thereof onto the substrate;

(b) removing residual gases in the process container therefrom after stopping supplying the source material;

(c) supplying a reductive gas to the substrate; and

(d) removing residual gases in the process container therefrom after stopping supplying the reductive gas.

4. The film deposition method according to claim 3, wherein the steps (b) and (d) are performed by replacing atmosphere in the process container with an inert gas, or by evacuating the processing container.

5. The film deposition method according to any one of claims 2 to 4, wherein the reductive gas is converted into radicals by using plasma when the reactive gas is supplied to the substrate.

6. The film deposition method according to any one of claim 2 to 5, wherein the reductive gas is H_2 gas.

7. The film deposition method according to any one of claims 1 to 6, wherein the source material contains copper trifluoroacetate.

8. A film deposition method that alternately performing a step of supplying a Cu-containing source material onto a substrate and a step of supplying a reductive gas to the substrate after stopping supplying the Cu-containing source material, wherein said method has:

a first film deposition period in an early deposition stage in which the two steps are performed alternately and each of the steps of supplying the reductive gas is performed for a first period of time T1; and

a second film deposition period following the first film deposition period in which the two steps are performed alternately and each of the steps of supplying the reductive gas is performed for a second period of time T2 shorter than the period of time T1.

9. A film deposition method comprising the steps of:

placing a substrate in a process container; and

repeating the following steps (a) to (d):

(a) supplying a Cu-containing source material onto the substrate;

(b) removing residual gases in the process container therefrom after stopping supplying the Cu-containing source material;

(c) supplying a reductive gas to the substrate; and

(d) removing residual gases in the process container therefrom after stopping supplying the reductive gas,

wherein said method has:

a first film deposition period in an early deposition stage in which the steps (a) to (d) are performed alternately and each of the steps of supplying the reductive gas is performed for a first period of time T1; and

a second film deposition period following the first film deposition period in which the steps (a) to (d) are performed

alternately and each of the steps of supplying the reductive gas is performed for a second period of time T2 shorter than the period of time T1.

10. The film deposition method according to claim 9, wherein the steps (b) and (d) are performed by replacing atmosphere in the process container with an inert gas, or by evacuating the processing container.

11. The film deposition method according to claim 8 or 10, wherein the first film deposition period continues until Cu deposited on the substrate becomes a continuous film, and the second film deposition period continues until a Cu film with a desired thickness is formed on the substrate.

12. The film deposition method according to any one of claims 8 to 11, wherein the first period of time T1 is in a range of 3 to 20 seconds and the second period of time T2 is in a range of 1 to 5 seconds.

13. The film deposition method according to any one of claims 8 to 11, wherein the reductive gas is converted into radicals by using plasma when the reactive gas is supplied to the substrate.

14. The film deposition method according to any one of claims 8 to 12, wherein the reductive gas is H_2 gas.

15. A storage medium in which software executable by a control computer of a film deposition system is stored, wherein upon executing the software the control computer controls the film deposition system to perform a Cu film deposition method,

wherein the film deposition method includes the steps of:

supplying a source material including a Cu-carboxylic acid complex or a derivative thereof onto a substrate; and

supplying a reductive gas to the substrate after stopping supplying the source material,

wherein the step of supplying the source material and the step of supplying the reductive gas are performed alternately.

16. A storage medium in which software executable by a control computer of a film deposition system is stored, wherein upon executing the software the control computer controls the film deposition system to perform a Cu film deposition method,

wherein the film deposition method alternately performs a step of supplying a Cu-containing source material onto a substrate and a step of supplying a reductive gas to the substrate after stopping supplying the Cu-containing source material,

wherein said method has:

a first film deposition period in an early deposition stage in which the two steps are performed alternately and each of the steps of supplying the reductive gas is performed for a first period of time T1; and

a second film deposition period following the first film deposition period in which the two steps are performed alternately and each of the steps of supplying the reductive gas is performed for a second period of time T2 shorter than the period of time T1.